

REMARKS

This application pertains to a novel process for separating solid substances, present in dissolved or colloidal form from solutions in a nonaqueous solvent with the aid of a ceramic membrane.

The membrane used in Applicants' process has a hydrophobic coating. The hydrophobic coating is produced on the membrane by treatment with silanes (page 4, line 7). The silanes used are those of the general formula $R_1R_2R_3R_4Si$, wherein at least one but at most three of the groups R_1 to R_4 are hydrolyzable groups, e.g. $-Cl$, $-OCH_3$ or $-O-CH_2-CH_3$ and/or at least one but at most three of the groups R_1 to R_4 are nonhydrolyzable groups, e.g. alkyl groups or phenyl groups.

Claims 1, 2 6-8, and 10-17 are pending.

Claims 1,2, 4-8, 10, 11 and 15-17 stand rejected under 35 U.S.C. 102(b) as anticipated by, or in the alternative, under 35 U.S.C. 103(a) as obvious over Karau, et al (US 6,472,571).

Karau (discussed in Applicants' specification at page 2, line 15 et seq. as EP 1 088 587 A2) describes a process for the production of organic compounds in a membrane reactor.

In their specification, Applicants' point out that:

"Published specification EP 1 088 587 A2 describes the use of ceramic membranes for retaining dissolved catalysts **increased in molar mass** (emphasis supplied) in organic solvents. As a result of enlarging the catalyst, the size difference between the product to be discharged and the catalyst to be retained increases. In addition, good retention, which is not impaired by the wetting of the pore walls with the solvent, can be achieved using larger pores.

The Karau process requires that the molecular weight (i.e., size) of the substance be increased in order for it to be retained by his membrane.

To this end, Karau illustrates his process with examples showing the retention ability of ceramic membranes for polystyrene (column 3, Table 2). The lowest molecular weight illustrated is 4000 daltons.

By contrast, Applicants' claims recite ceramic membranes having a retention of less than 1000 g/mol (i.e., less than about 1000 daltons). Karau is limited to the separation of catalysts of increased molecular weight, which means that the molecular weight of the catalysts to be separated must be increased before they can be separated by the Karau process.

Nothing can be found in the Karau reference that would lead to a ceramic membrane having a retention of less than 1000 g/mol.

Applicants have previously pointed out that the membrane disclosed by Karau has only two layers, whereas Applicants' has three. To this the Examiner argues that the reference has a ceramic support layer, an inter layer and a silane layer. The Examiner seems to equate this to Applicants' three layers.

However, Applicants' membrane is a ceramic membrane having at least three ceramic layers. Support for the amendment of Applicants' claims to recite three ceramic layers is found in the Examples, which recite (in Example 1) a membrane A which consists of a porous substrate comprising α -alumina, and intermediate layer comprising TiO_2 , and a separation layer comprising TiO_2 . Clearly, Applicants "at least three layers" are at least three ceramic layers.

Contrary to the Examiner's arguments, Karau's silane layer is not a layer at all! Karau's silane is used to "modify" Karau's interlayer (col. 3, lines 37-46) and does not in and of itself constitute an additional layer. Further, Applicants' membrane has three ceramic layers, and even if Karau's silane was considered to be a third layer, which it is not, such third layer would not be a ceramic third layer.

Further, nothing in Karau would teach or suggest the use of a third ceramic layer.

Karau does not teach or suggest that a retention of 1000 g/mol is desirable or even possible. If, for example, Karau knew how to attain a retention of 1000 g/mol, he would not have had to limit his process to the separation of catalysts having increased molecular weight.

While the Examiner argues that the molecular weight of the Karau reference does not increase in molecular weight during the process, it is clear that the molecular weight must be increased before the separation process can start.

The fact of the matter is that the Karau process is completely different than Applicants', and nothing to be found anywhere in the Karau reference would teach or suggest the changes required to arrive at Applicants' process.

Accordingly, no person reading Karau could ever arrive at Applicants' novel process, and the rejection of claims 1,2, 4-8, 10, 11 and 15-17 under 35 U.S.C. 102(b) as anticipated by, or in the alternative, under 35 U.S.C. 103(a) as obvious over Karau, et al (US 6,472,571) should now be withdrawn.

Claims 12-14 stand rejected under 35 U.S.C. under 35 U.S.C. 103(a) as obvious over Karau as applied to claim 2 above. and further in view of WO 01/07157. As pointed out above, the Karau reference concerns a different process than Applicants', uses a completely different membrane, and neither teaches nor suggests the changes that would be required to arrive at Applicants' process.

The Examiner contends that it would be obvious to modify Karau with the teaching of the WO reference for the particle size, or modify the WO membrane with the teaching of the silane coating of Karau to form an improved membrane for separating the particle size as in WO with the efficiency of Karau.

The Examiner does not explain, however, how the Karau membrane could be modified to handle the particle size of the catalysts in the WO reference. Karau clearly needs to increase the molecular weight of the catalysts in order to achieve the desired separation. Therefore, the "particle size of the catalysts in the WO reference" could not be separated with the Karau membrane.

The so-called "silane coating of Karau" is not a coating or a layer at all. Karau teaches that his interlayer can be "modified" using organic groups to modify its separation process (e.g. hydrophobia and hydrophilia) (col. 3, lines 40-44). Accordingly, the silanes mentioned by Karau do not form a "layer" or a "coating", but merely react with the surface of the interlayer to render it hydrophilic or hydrophobic.

Modifying the Karau membrane by e.g. rendering it hydrophobic would not overcome the differences discussed above between the Karau membrane and

Applicants'. The same differences would still exist even with the membrane surface of Karau being made hydrophobic.

It can therefore be seen that no combination of Karau and the WO reference could ever lead to Applicants novel membrane, and the rejection of claims 12-14 under 35 U.S.C. under 35 U.S.C. 103(a) as obvious over Karau as applied to claim 2 above and further in view of WO 01/07157 should now be withdrawn.

In view of the present amendments and remarks, it is believed that claims 1, 2 6-8, and 10-17 are now in condition for allowance. Reconsideration of said claims by the Examiner is respectfully requested, and the allowance thereof is courteously solicited. Should the Examiner not deem the present amendment and remarks to place the instant claims in condition for allowance, it is respectfully requested that this Amendment Under Rule 116 be entered for the purpose of placing the prosecution record in better condition for appeal.

CONDITIONAL PETITION FOR EXTENSION OF TIME

If any extension of time for this response is required, Applicants request that this be considered a petition therefor. Please charge the required petition fee to Deposit Account No. 14-1263.

ADDITIONAL FEE

Please charge any insufficiency of fee or credit any excess to Deposit

Account No. 14-1263.

Respectfully submitted,
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